CHAIR’S REPORT ................................................................. 3
DEPARTMENT OF MEDICAL IMAGING - UNIVERSITY OF TORONTO ....................... 6
Radiologists-in-Chief ......................................................... 6
Program Directors .......................................................... 6
Division Heads ................................................................ 6
Department Administrative Staff ...................................... 6
COMMITTEES .................................................................. 7
Executive Committee ....................................................... 7
Promotions Committee .................................................... 7
Undergraduate Teaching Committee ................................ 7
Specialty Training Committee .......................................... 7
UNIVERSITY OF TORONTO FULLY AFFILIATED HOSPITALS AND INSTITUTES .... 8
DEPARTMENT OF MEDICAL IMAGING FACULTY .............................................. 9
THE DEPARTMENT OF MEDICAL IMAGING AND THE UNIVERSITY OF TORONTO
TEACHING HOSPITALS .......................................................... 12
RESEARCH GRANTS ........................................................... 15
PUBLICATIONS: PEER-REVIEWED PAPERS AND ABSTRACTS ....................... 20
PUBLICATIONS: NON-PEER-REVIEWED, BOOKS, CHAPTERS ..................... 34
INVITED PRESENTATIONS AND VISITING PROFESSORSHIPS ....................... 36
SCIENTIFIC PRESENTATIONS: PEER-REVIEWED PAPERS, .......................... 52
POSTERS AND EXHIBITS ....................................................... 52
RESEARCH PROGRAM ........................................................... 70
Welcome to Dr. Timothy Roberts ........................................... 70
The Research Program ....................................................... 70
The Medical Imaging Research and Development Awards (Protected Research Time) 
RSNA Resident/Fellow Research Award ................................ 71
Research Day ................................................................ 72
Positron Emission Tomography Centre, Centre for Addiction and Mental Health
Imaging/Bioengineering Research, SWCHSC .......................... 72
Faculty List .................................................................. 72
Grants ........................................................................ 73
Publications ................................................................ 75
Original Scientific Presentations ....................................... 79
Invited Papers and Professorships ..................................... 80
Awards and Honors ......................................................... 81
Teaching -- Hours of Lectures ............................................ 81
Department of Medical Imaging Annual Research Day 2002 .............................. 82
RESIDENT TRAINING PROGRAM ......................................................... 83
General Description ......................................................... 83
PGY1 ........................................................................ 83
PGY2 ........................................................................ 83
PGY3 ........................................................................ 84
PGY 4 ...................................................................... 84
PGY5 ........................................................................ 84
Armed Forces Institute of Pathology ..................................... 84
Physics Instruction .......................................................... 84
Conferences ................................................................. 85
Seminars and Half-Day Program ........................................ 85
Research ................................................................. 85
INVITED LECTURERS AND VISITING PROFESSORS

SPECIALTY TRAINING REQUIREMENTS IN DIAGNOSTIC RADIOLOGY

OBJECTIVES OF TRAINING & SPECIALTY TRAINING REQUIREMENTS IN RADIOLOGY SCIENTIST TRAINING PROGRAM

NUCLEAR MEDICINE TRAINING PROGRAM

RADIOLOGY SCIENTIST TRAINING PROGRAM

RESIDENTS

PGY1 Level
PGY2 (R1) Level
PGY3 (R2) Level
PGY4 (R3) Level
PGY5 (R4) Level

NUCLEAR MEDICINE TRAINING PROGRAM

RADIOLOGY SCIENTIST TRAINING PROGRAM

OBJECTIVES OF TRAINING & SPECIALTY TRAINING REQUIREMENTS IN DIAGNOSTIC RADIOLOGY

DIAGNOSTIC RADIOLOGY

Definition
General Objectives
Specific Objectives
Training in Canada

SPECIALTY TRAINING REQUIREMENTS IN DIAGNOSTIC RADIOLOGY

RESIDENT RESEARCH PROGRAM

FELLOWSHIP PROGRAM

UNDERGRADUATE PROGRAM

CONTINUING EDUCATION PROGRAM

INVITED LECTURERS AND VISITING PROFESSORS
CHAIR’S REPORT

The Annual Report details the contributions made by our faculty, residents and fellows to the Department, and to the greater academic and clinical community. It also describes the major physical and organizational changes at the University and its affiliated teaching hospitals. This report demonstrates the remarkable breadth of our activities and the accomplishments of our people. Our people continue to be its most important asset. Accordingly, as in previous years, I would like to highlight the accomplishments of our faculty members, especially those that have distinguished themselves in teaching and research.

Our departmental teaching awards this year were: Dr. TaeBong Chung was presented with the Edward L. Lansdown Award for Outstanding Teaching in the Residency Training Program. Dr. TaeBong Chung, Dr. John Clark, Dr. Lisa Ehrlich, Dr. Richard Farb, Dr. Nasir Jaffer, Dr. Damien Maharaj, Dr. Lyne Noël de Tilly, Dr. Joel Rubenstein, Dr. David Salonen, and Dr. William Weiser were recognized for outstanding teaching in the residency program; Dr. Paul Babyn, Dr. Susan Blaser, Dr. Masoom Haider, Dr. Anthony Hanbidge, Dr. Chia Sing Ho, Dr. Martin O’Malley, Dr. Joséé Sarrazin, and Dr. Stephanie Wilson were recognized for outstanding teaching in the fellowship program; and Dr. Mostafa Atri, Dr. Edna Becker, Dr. Dae-Gyun Chung, Dr. Alan Daneman, Dr. Korosh Khalili, Dr. Matthew Lax, and Dr. Shi-Joon Yoo achieved distinction for outstanding teaching in both the residency and fellowship programs.

Our department continued to increase the level of support of its faculty for protected research time. This year, the faculty members with departmentally sponsored research time were: Dr. Murray Asch (Safety and effect of percutaneous temporary portal vein occlusion on the size of a thermal lesion in porcine livers), Dr. Mostafa Atri (Accuracy of unenhanced helical CT and added value of enhanced helical CT in the assessment of acute abdomen), Dr. John Clark (Non-lethal murine vascular imaging), Dr. Richard Farb (Follow-up evaluation of GDC treated aneurysms: Comparison of ATECO MRA, 3D time of flight and IADSA), Dr. Alan Fox (3D cone beam CT for acute cervical spine and facial trauma), Dr. Masoom Haider (MRI and CT dynamic enhancement in carcinoma of the uterine cervix: Correlation with direct interstitial fluid pressure measurement and tumor oxygen levels), Dr. Roberta Jong (American College of Radiology Imaging Network, ACRIN 6652, Digital vs screen-film mammography), Dr. Korosh Khalili (Preoperative Staging of Cholangiocarcinoma: A Prospective Comparative Study of Sonography and MRI), Dr. Naeem Merchant (Effects of ACE inhibitor and beta blocking therapy in patients with systemic right ventricles), Dr. Derek Muradali (Contrast enhanced sonography of the breast nodules and lymph nodes: Vascular morphology and pathologic correlation), Dr. Martin O’Malley (Hepatocellular carcinoma: Features on triphasic CT using a multidetector helical CT scanner), and Dr. Dawn Pearce (The role of weight-bearing CT scan of the foot in pres planus). In addition to the faculty named above, another four radiologists had 50% of their time protected for their research interests: Dr. Shi-Jin Yoo at the Hospital for Sick Children, and Drs. Stephanie Wilson, Masoom Haider and David Mikulis at the University Health Network.

The highlight of our academic year was our Annual Research Day, which held in the Sadowski Auditorium at Mount Sinai Hospital on April 15, 2002. Thirty excellent research papers were given by residents, fellows and faculty. The progressive improvement in the content and style of
the research papers over the past several years at Research Day has been very gratifying to all of us with an interest in the academic development of our Department.

The academic promotions this year were (effective July 1, 2002): to Associate Professor – Dr. Katherine Fong and Lawrence White and to Assistant Professor - Dr. Korosh Khalili and Dheeraj Rajan.

We welcomed several new faculty to our department: Dr. Petrina Causer - Sunnybrook and Women’s College Health Sciences Centre, Dr. Raymond Chan - St. Michael’s Hospital, Dr. Jane Crossin - University Health Network, Dr. Dorothy Lazinski - University Health Network, Dr. Thomas Marotta - University Health Network, Dr. Stephen Miller - Hospital for Sick Children, Dr. Oscar Navarro - Hospital for Sick Children, Dr. Sophie Pantazi - University Health Network, Dr. Narinder Paul - University Health Network, Dr. Kamaldine Oudjhane - Hospital for Sick Children and Dr. Karen Thomas - Hospital for Sick Children, Dr. Donald Turner - Sunnybrook and Women’s College Health Sciences Centre.

Dr Tim Roberts joined us in February 2002, after a ten-year career at University of California, San Francisco. We were most fortunate to recruit Tim. He is an internationally acknowledged expert in magnetic resonance imaging and magnetoencephalography. We were doubly fortunate in that he was awarded a Canada Research Chair in Medical Imaging Research on his appointment. I appointed Dr. Roberts as Deputy Chair of the Department and Director of our Research Program. Since joining us he has been very busy. He has established a graduate student research program through the Institute of Medical Science (IMS), and an Image Analysis Centre at University Health Network with funds awarded by CFI and ORDCF. He has hired several post-doctoral students already, and is actively recruiting other scientists to his group.

There are several people that require special mention for their extra-ordinary efforts on behalf of our Department. Dr. Edna Becker completed her term as Director of our Residency Program this past year. She did an absolutely remarkable job! Her excellence was widely recognized by our trainees, the faculty in Medical Imaging, the University, and the entire Canadian radiology community. She has been succeeded by Drs. Walter Montanera and Suzanne Laughlin, who will share the position of Program Director. Dr. Harry Shulman will step down as Radiologist-in-Chief at Sunnybrook and Women’s College Health Sciences Centre this coming winter, after 17 years in the job. He will be succeeded by Dr. Alan Moody from Nottingham, United Kingdom. The hospital grew tremendously during Harry’s tenure, both in terms of size and complexity. He saw it through some very complicated organizational changes with mergers and re-structuring. Hopefully his transition to faculty radiologist will reward him with piece of mind, job satisfaction and less paperwork. Dr. Robyn Pugash was our inaugural webmaster, as well as being the Director of the Fellowship Program. She invested a lot of her free time into establishing and maintaining our electronic presence, but this year with the tremendous manpower pressure facing Interventional Radiology, she handed off the web responsibilities to Mr. Paul Ferrari. She continues as our Fellowship Director. Our undergraduate program was substantially re-organized by Dr. Tim Dowdell, with the help of Co-Director, Dr. Nasir Jaffer. Tim and Nasir converted a major portion of our teaching on radiologic-anatomic correlation into electronic media. This greatly improved the delivery of this part of our curriculum. I congratulate and thank them for their efforts.
Members of the Department have frequently been the winners of major teaching awards, but no one more so than Dr. Gregory Olscamp. Last year he won the W.T. Aikins Award for excellence in Undergraduate teaching, considered to be the most prestigious award in the Faculty of Medicine. Sadly, we experienced an immense loss with his death in August 2001. Greg was an outstanding physician, teacher and person. We will all miss him.

Walter Kucharczyk, M.D., F.R.C.P. (C)
Professor and Chair
Chair ........................................................................................................................................... Kucharczyk, W.
Associate Chair .................................................................Roberts, T.

**Radiologists-in-Chief**

Hospital for Sick Children ................................................................. Babyn, P.
Mount Sinai Hospital-University Health Network (Princess Margaret Hospital/
Toronto General Hospital/Toronto Western Hospital) ......................................... Bret, P.
St. Michael's Hospital ....................................................................... Common, A.
Sunnybrook & Women's College Health Sciences Centre ........................... Shulman, H.S.

**Program Directors**

Continuing Education ................................................................. Hamilton, P.
Fellowship .................................................................................... Pugash, R.
Neuroradiology ............................................................................. Willinsky, R.
Nuclear Medicine ................................................................. Hershkop, M.
PGY I ......................................................................................... Clark, J.
Radiology Residency ................................................................. Montaner, W.
Radiology Residency (Co-Director) ................................................... Laughlin, S.
Research ........................................................................................... Roberts, T.
Undergraduate ............................................................................... Dowdell, T.
Undergraduate (Co-Director) ............................................................... Jaffer, N.

**Division Heads**

Abdominal Imaging ...................................................................... Atri, M.
Breast Imaging ............................................................................... Muradali, D.
Cardiothoracic
  Cardiac Imaging ........................................................................ Merchant, N.
  Thoracic Imaging ........................................................................ Paul, N.
Musculoskeletal Imaging ................................................................. White, L.
Neuroradiology ............................................................................. TerBrugge, K.G.
Pediatric Imaging ........................................................................... Manson, D.
Vascular and Interventional Radiology ............................................ Asch, M.

**Department Administrative Staff**

Business Officer ........................................................................... Sciortino, G.
Secretary .......................................................................................... Shea, A.
COMMITTEES

Executive Committee
Kucharczyk, W. (Committee Chair)
Babyn, P.
Bret, P.
Clark, J.
Common, A.
David, E. (Chief Resident – July 1, 2001)
Dowdell, T.
Hamilton, P.
Hershop, M.
Jaffer, N.
Laughlin, S.
Montanera, W.
Pugash, R.
Roberts, T.
Salem, S.
Shulman, H.

Promotions Committee
Wilson, S. (Committee Chair)
Babyn, P.
Jaffer, N.
Rubenstein, J.
TerBrugge, K
Weiser, W.
Yaffe, M.

Undergraduate Teaching Committee
Dowdell, T. (Committee Chair)
Chan, R.
Jaffer, N.
Kachura, J.
Lax, M.
Montanera, W.
Paul, N.
Pearce, D.
Weiser, W.

Specialty Training Committee
Montanera W. (Committee Chair)
Clark, J.
Hendler, A.
Laughlin, S.
MacDonald, C.
Mikulis, D.
Muradali, D.
Pearce, D.
Christakis, M.
David, E. (Chief Resident)
Jaskolka, J.
Kirpalani, A.
Stanietzky, N.
Wilkinson, L.
Yu, Robert
### UNIVERSITY OF TORONTO FULLY AFFILIATED HOSPITALS AND INSTITUTES

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<th>Hospital Name</th>
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<td><strong>Hospital for Sick Children</strong></td>
<td>555 University Avenue Toronto, Ontario M5G 1X8</td>
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<td><strong>Mount Sinai Hospital</strong></td>
<td>600 University Avenue Toronto, Ontario M5G 1X5</td>
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<td><strong>St. Michael's Hospital</strong></td>
<td>30 Bond Street Toronto, Ontario M5B 1W8</td>
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<td><strong>Sunnybrook &amp; Women’s College Health Sciences Centre</strong></td>
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<td>Women’s College Campus</td>
<td>76 Grenville Street Toronto, Ontario M5S 1B2</td>
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<td><strong>University Health Network</strong></td>
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<td>Princess Margaret Hospital</td>
<td>610 University Avenue Toronto, Ontario M5G 2M9</td>
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<td>Toronto General Hospital</td>
<td>200 Elizabeth Street Toronto, Ontario M5G 2C4</td>
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<td>399 Bathurst Street Toronto, Ontario M5T 2S8</td>
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<td><strong>Centre for Addiction and Mental Health</strong></td>
<td>250 College Street Toronto, Ontario M5T 1B8</td>
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<td><strong>Positron Emission Tomography Centre</strong></td>
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<td>Turner, D.</td>
<td>Lecturer</td>
</tr>
<tr>
<td>Wall, J.</td>
<td>Lecturer</td>
</tr>
</tbody>
</table>

- 10 -
Weisbrod, G.L. Professor Cardiothoracic Imaging University Health Network
Weiser, W.J. Professor Cardiothoracic Imaging St. Michael’s Hospital
White, L. Associate Professor Musculoskeletal Imaging Mount Sinai Hospital
Willinsky, R.A. Professor Neuroradiology University Health Network
Wilson, C. Assistant Professor Breast Imaging University Health Network
Wilson, S.R. Professor Abdominal Imaging University Health Network
Wood, M.L. Professor Research/Medical Biophysics Sunnybrook & Women’s College Health Sciences Centre
Wright, B.E. Assistant Professor Breast Imaging Sunnybrook & Women’s College Health Sciences Centre
Xiang, J. Lecturer Research Sunnybrook & Women’s College Health Sciences Centre
Yaffe, M.J. Professor Research/Medical Biophysics Sunnybrook & Women’s College Health Sciences Centre
Yoo, S.-J. Professor Pediatric Imaging Sunnybrook & Women’s College Health Sciences Centre
Zalev, A.H. Assistant Professor Abdominal Imaging St. Michael’s Hospital
Zelovitzky, J.L. Assistant Professor Cardiothoracic Imaging University Health Network

Cross Appointments

Bronskill, M.J. Professor Medical Biophysics
Foster, S. Professor Medical Biophysics
Freedom R. Professor Pediatrics
Henkelman, R.M. Professor Medical Biophysics
Johnson, J.A. Associate Professor Obstetrics and Gynaecology
McLaughlin, P.R. Professor Medicine
Noseworthy, M. Assistant Professor Medical Biophysics
Pharoah, M.J. Professor Dentistry
Plewes, D.B. Professor Medical Biophysics
Trachtenberg, J. Professor Surgery
Vanek, I. Assistant Professor Ophthalmology

Radiation Sciences Program (Joint Program with Michener Institute)

Babiak, C. Instructor
Crowley, S. Instructor
Goodin, L. Instructor
Kelly, E. Instructor
Poulin, D. Instructor
Rodrigues, G. Instructor
Sharpe, W. Instructor
Souter, C. Instructor
Stone, J. Instructor
Topple, A Instructor
Watson, T. Instructor
Wilson, D. Instructor
Wong, B. Instructor
THE DEPARTMENT OF MEDICAL IMAGING AND
THE UNIVERSITY OF TORONTO TEACHING HOSPITALS

The academic programs in the Department of Medical Imaging are integrated with its five major teaching hospitals: the University Health Network (UHN), Mount Sinai Hospital (MSH), St. Michael’s Hospital, Sunnybrook & Women’s College Health Sciences Centre, and the Hospital for Sick Children. The medical imaging departments at UHN and MSH are consolidated into a single operational unit under the leadership of Dr. Patrice Bret. The other hospitals’ Medical Imaging departments are led by Dr. Andrew Common, Dr. Harry Shulman, and Dr. Paul Babyn. Short descriptions of each hospital department are presented below.

University Health Network/Mount Sinai Hospital

This joint Department of Medical Imaging was created in 1997 from the merger of the Departments of Medical Imaging at Mount Sinai Hospital, Toronto Western Hospital, Princess Margaret Hospital, and Toronto General Hospital. The latter three hospitals also merged at the corporate level into the University Health Network (UHN), while Mount Sinai Hospital remained corporately separate.

The Department has a full-time medical imaging faculty of 45 radiologists and nuclear medicine specialists, over 20 post-residency fellows, and approximately 50-60% of the residents registered in the University of Toronto Program. Its practice is carried out in a highly integrated manner at four sites in downtown Toronto. An internally developed PACS system has greatly facilitated the integration across sites and with other departments.

The past year saw tremendous recruitment of new faculty, not only from within Canada, but also internationally, and a substantial increase in activity. Twelve new faculty members joined the Department! Overall clinical activity increased by 6.5% from last year. For the year ended March 31, 2002, 636,386 examinations were performed.

Many of the Department’s faculty continued to play major leadership roles in the academic programs of the University of Toronto, including the residency and fellowship programs, and the leadership of many of the subspecialty divisions. The Department is leading the effort to acquire a clinical PET system, and soon a 3T MRI system will add to the complement of its eight current MRI units. A Research Group and Image Analysis Centre were established under the leadership of Dr. Tim Roberts. The Group will have offices at all the sites and at the University of Toronto.

Members of the Department have frequently been the winners of major teaching awards, but no one more so than Dr. Gregory Olscamp. Last year he won the W.T. Aikins Awards for excellence in Undergraduate Teaching, considered to be the most prestigious award in the Faculty of Medicine. Sadly, we experienced an immense loss with his death in August 2001. Dr. Gregory Olscamp was an outstanding physician, teacher and person. A memorial scholarship was set up to honor his memory.
Sunnybrook and Women’s College Health Sciences Centre

Sunnybrook and Women’s College Health Sciences Centre is a result of the merger of Sunnybrook Health Sciences Centre, Women’s College Hospital and the Orthopedic and Arthritic Hospital in June 1998. The Department of Medical Imaging is an integrated department and functions on all three campuses. The Department has 20 full-time faculty members.

The hospital has 2 clinical MRI units (GE 1.5 T TWIN), 2 research MRI units (GE 1.5 T and 3.0T), and 3 CT scanners (2 multislice, 1 single slice). A 4th CT scanner is scheduled to be operational this year. In Nuclear Medicine there are 6 SPECT cameras (Picker/Marconi) as well as a Gamma PET. The hospital has 15 ultrasound units, mainly ATL. The angiography rooms are equipped with Philips equipment (Integris). All modalities are fully integrated with state-of-the-art PACS and RIS (Agfa and IDX), supporting an annual workload of approximately 260,000 exams per year.

The Hospital has 5 major programs. These include Trauma, Cancer, Heart and Circulation, Musculoskeletal, Perinatal and Gynecology. More information about the hospital can be found on our website at: http://www.sunnybrookandwomens.on.ca/

St. Michael’s Hospital

The Medical Imaging Department at St. Michael’s Hospital has undergone considerable expansion and remodelling in the past few years, concomitant with the integration of programs and services from the Wellesley Central Hospital, which is now closed. The annual tally of imaging examinations is over 240,000, excluding a very busy cardiac catheterization service which performs over 4000 radiologist-interpreted procedures per year. Virtually all of the imaging equipment has been replaced in the past few years, with two new helical CT scanners, two new MRI units, and three angiography suites, including a bi-plane neuro-interventional facility. The general radiographic equipment has also been upgraded to PACS readiness. PACS is budgeted in the Hospital’s Strategic Information Plan for the years 2002/2003. An aggressive recruiting campaign of sub-specialist radiologists has brought staffing levels to 20. This will allow the department to better meet the needs of the University Residency and Fellowship Programs. St. Michael’s is proud of its commitment to teaching and clinical excellence, with a lesser emphasis historically on research. The hospital has recently appointed a renowned critical care researcher as VP of Research, and there is renewed commitment to increasing the research profile of the hospital and of the Imaging Department in particular. Other unique hospital attributes which are reflected in the Medical Imaging Department at St. Michael’s are the Inner City Health focus, the world-renowned Minimal Access Therapeutics Program, and the HHT Program. Further, St. Michael’s is Toronto’s only downtown trauma centre. It has outstanding clinical and research programs in Heart and Vascular and Renal Diseases, both of which are actively supported by the Medical Imaging Department.
The Hospital for Sick Children

The Hospital for Sick Children Department of Diagnostic Imaging provides full imaging service for all children up to the age of 18 years. We currently perform approximately 130,000 examinations per year. The department has 21 full-time staff, with pediatric imaging sub-specialists in Neuroradiology, interventional, cardiology, and body cross-sectional imaging. The department has two 1.5T MR scanners, two CT scanners, (including one 8 slice CT), along with a dedicated Image Guided Therapy suite. This suite allows both interventional radiology and minimally invasive surgical procedures to be combined, and consists of four rooms containing integrated CT fluoroscopy, a biplane unit, and two single plane fluoroscopic units with ultrasound units. The department has an active sonography service with eleven ultrasound units. There is an integrated PACS and RIS system providing image and report distribution throughout the department and the hospital. Research and sub-specialty training are active interests of the department with three imaging scientists and eleven fellows in subspecialty training from across the world.
RESEARCH GRANTS

Members of the Department of Medical Imaging (underlined) were investigators on the following grants, identified by the principal investigator, other investigators, project title, sponsor, total amount of grant, and start and end dates of the funding period.


Cheyne D. “Mapping the Human Sensorimotor Cortex using Spatially Filtered Magnetoencephalography” NSERC - Individual Research Grant, $40,000 2002-2004


Friedman J, Mahant S (Project Investigators), Connolly B, Chait, P, Marthur C (Co-Investigator(s)/Collaborators). G tube registry for outcomes and quality of life of neurologically impaired children with radiologically placed G tubes. PSI 2002


Haider M (Principal Investigator). Predicting the response of liver metastases to chemotherapy using MRI perfusion and MRI oxymetry. CHAR/Nycomed Development Awards Program. $6000.00. 2001.

Haider M (Principal Investigator), Toi A, Sweet J, O’Malley M, Trachtenberg J (Co-Investigators). The utility of functional and morphologic MRI in the detection of prostate cancer for patients with elevated PSA and prior negative biopsy. PMH Foundation. $30,000.00. April 2002.

Haider M (Principal Investigator). The utility of functional and morphologic MRI in the detection of prostate cancer for patients with elevated PSA and prior negative biopsy. CHAR/Amersham Development Awards Program. $4500.00. 2002.


Jong RA. Digital Mammography Imaging Screening Trial Pisano ED (Principal Investigator), Hendrick RE (Co-Principal Investigator), (Toronto Site Clinical Investigator) National Cancer Institute $26,500,000 (US$) for 2001-2004.


Lesley M (Principle Investigator), Chait P (Co-Investigators/Collaborators). PARKAA ATIIIASP Multi Centre Study. Bayer Inc. ($127,093.00) 1997 - Ongoing

Mah K, Caldwell CB, and Danjoux C. 2002-2003 “Can $^{18}$FDG-PET images provide the 3D extent of lung tumour motion for individualized radiation targeting?” National Cancer Institute of Canada Operating Grant. Principle Investigators:. $63,000/year (2 years total).


Narod S (Principal Investigator), Nam R, Trachtenberg J, Jewett M, Fleschner N, Pollak M, Toi A, Brunet JS (Co-Investigators). The role of serum IGF-1 levels and androgen receptor genotype in prostate cancer diagnosis. NCIC. $140,000.00 per annum. 1999-2002.

Noseworthy MD, Macgowan CK (Co-Principal Investigators). Advanced SUN UNIX computer server and network for imaging physics research. (Accepted, SUN Canada, Jan 31. 2002. $250,000)

Pang EW (Principle Investigator), Otsubo H, Sharma R, Chuang S (Co-Applicants), Division of Neurology (Primary Investigator's Department). Examination of auditory function in children using magnetoencephalogram. ($16,316)

Parker C (Principal Investigator), Milosevic M, Warde P, Toi A, Sweet J (Co-Investigators). A clinical study of the effect of recombinant human erythropoietic (rHuEPO) of tumor oxygenation in prostate cancer. Anemia Institute for Research and Education. $54,700.00 over 2 years 2002.


Reilly RM (Principal Investigator), Baruchel S (Co-Investigator). Novel targeted Auger electron radiotherapy of neuroblastoma using $^{123}$I-MIBG. James Birrell Neuroblastoma Research Fund. $35,000.00 (2001-2002).

Reilly RM (Principal Investigator), Vallis KA, Oza A, Lockwood G, Hendler A, Cameron R. Preclinical lead-up studies in support of an IND application for $^{111}$In-hEGF: A new

Reilly RM (Principal Investigator), Brandwein, J, Dick J, Minden M. Novel targeted Auger electron radiotherapy of acute myelogenous leukemia. Canadian Institutes of Health Research (CIHR). $210,000.00 (2002-2005).


Saint-Cyr J (Principal Investigator), Mikulis DJ (Co-Investigator). Radiological and clinical evaluation of subthalamic nucleus deep brain stimulation. The Parkinson Foundation of Canada. $28,500.00 per annum 2001-2002.


PUBLICATIONS: PEER-REVIEWED PAPERS AND ABSTRACTS


Callen DJ, Black SE, Gao F, Caldwell CB, Szalai JP. “Beyond the hippocampus: MRI volumetry confirms widespread limbic atrophy in AD.” Neurology 2001 Nov 13;57(9):1669-74


Chuang S. Integrating MEG. Taiwan Pediatric Epilepsy Congress, Tao Yuan, Taiwan, Nov. 3-7, 2001.

Chuang S. Neuroimaging Studies for Epilepsy Surgery in Children. Taiwan Pediatric Epilepsy Congress, Tao Yuan, Taiwan, Nov. 3-7, 2001.


Hahn CD; Shroff MM; Blaser SI; Banwell BL. MRI criteria for multiple sclerosis: Evaluation in a pediatric cohort. Hahn CD; Shroff MM; Blaser SI; Banwell BL. NEUROLOGY 2002, Vol 58, Iss 7, pp A173-A173.


Shah P, Glanc P, Ng E. Asymptomatic morgagni hernia in a neonate. J Pediatrics Online, April 2002 Vol 140, N0.4 pg


Vijay RKP, John P. Acute limb ischaemia in children: a retrospective study and pictorial review. UK Radiological Congress 2002 Abstracts: 89


PUBLICATIONS: NON-PEER-REVIEWED, BOOKS, CHAPTERS


Clark JA. A Vague Impression. AJR 2001; 177:468. [letter]


INVITED PRESENTATIONS AND VISITING PROFESSORSHIPS


Atri, M. Sonography of acute lower quadrant pain. Ontario Society of Diagnostic Medical Sonographic annual meeting. Toronto, Ont. April 2002


Bret P. Controversies in Gastroenterology. MRCP is more cost-effective than ERCP in the initial work-up of patients with suspected biliary obstruction. (Pro) Biliary Debate Session. Sheraton Centre. Toronto, Ontario. April 8-10, 2002.


Causer P. The Role of MRI in breast imaging. Presented at the Women and Breast cancer conference, Oct 2001, Women's Health Program, UHN.


Cheung G. “Percutaneous Vertebroplasty”, Course on Management of Bone Metastases, Toronto Sunnybrook Regional Cancer Centre, February 22, 2002


Cheung G. 7th Annual Conference: The Science & Art of Pain and Symptom Management Faculty of Medicine, University of Toronto. November 17 & 18, 2000.


Clark JA. GI/GU What’s New, Michener Institute, Toronto; Film Interpretation Session (course faculty) April 13, 2002.


Kachura JR. Visiting Professor. Gastrointestinal bleeding. Memorial University, St. John’s, Newfoundland. February 28, 2002.


Mikulis DJ. Visiting Professorship. fMRI and neuroradiology; Difficult spine cases; CVR in Moya Moya Disease. Massachusetts General Hospital, Boston, Massachusetts. January 16-17, 2002.


Muradali D. Imaging the augmented breast. 2nd Annual Toronto Breast Surgery Symposium. Mount Sinai Hospital, Toronto, Ontario. April 4, 2002.


O'Malley ME. GU radiology: Overview and review. GI/GU Minicourse. Massachusetts General Hospital, Boston, Massachusetts. April 03, 2002.


Oudjhane K. Moderator, Scientific Session "Growth plate/Bone Dynamics/Diagnosis" The International Skeletal Society 28th Annual Refresher Course Quebec City, QC, CANADA, September 5-8 2001


Reilly RM. Molecular imaging of cancer. The Faculty of Pharmacy, University of Toronto, Toronto, Ontario. April 10, 2002.


TerBrugge K. Aneurysm treatment (coiling/clipping); The role of 3D DSA in neuroendovascular treatment; Endovascular treatment of dural AVF; Endovascular treatment of epitaxis and head and neck AVM/AVF; Management of carotid cavernous fistulas and vertebral fistulas; Cerebral venous ischemia; Imaging and the role of embolization. 3rd Annual South African Interventional Neuroradiology Peer Review Group. South Africa. August 31-September 1, 2001.


TerBrugge K. Berry aneurysms and risk of hemorrhage; Natural history of BAVMs; Micro AVM; Fusiform aneurysms; False aneurysms; Multiple aneurysms; Classification of maxillo-facial vascular lesions; Rendu-Osler Weber Disease; AVF (glue). 2000-2001 International Master Degree in Neurovascular Diseases. Chiangmai, Thailand. November 3-8, 2001.


TerBrugge K. Venous injuries, thromboses and hemorrhages; DAVs and cortical venous drainage; Spontaneous thrombosis; Abused children; Para spinal and epidural lesions; Spinal cord vascular tumors (hemangioblastomas); SC cavernoma; Hemangioblastomas; Para spinal AVM; DAVs Sacral; SCAVM. 2001-2002 International Master Degree in Neurovascular Diseases. Chiangmai, Thailand. March 31-April 5, 2002.


Wilson SR. Gestational trophoblastic disease; Microbubble contrast agents: Their role in the characterization and detection of focal masses; The acute abdomen of hollow visceral origin: Sonographic assessment; Biliary sonography; The rectum and anal canal: Transrectal, transvaginal and transperineal scanning. 23rd Annual Diagnostic Imaging Seminar Ultrasound


Wilson SR. Ultrasound contrast agents: Their use in liver mass characterization and detection; The acute abdomen of hollow visceral origin; Inflammatory bowel disease. OB\GYN and Abdominal Sonography Update. San Francisco, California. March 2, 2002.


SCIENTIFIC PRESENTATIONS: PEER-REVIEWED PAPERS, POSTERS AND EXHIBITS


Armstrong D. 1) Patterns of Brain Injury and Imaging; 2) Outcomes of Very Low Birth Weight Babies – how early can we predict? Patterns of Brain Injury and Imaging. Research Seminar Workshop, Mount Sinai Hospital, April 12, 2002.


Blaser S. Craniofacial malformations. ENT Surgical grand rounds. University of Toronto, September 27th, 2002


Blaser S. Neonatal infections. The 7th biennial meeting European Society MRN; Hammersmith Hospital, London UK, March 14th – 16th, 2002


Chait P. Future Directions in Interventional Pediatric Radiology, AVIR, Baltimore, Maryland, April 2002.


Chait P. Paediatric Interventional Lessons Learned. 27th Annual SCVIR Meeting, Baltimore, Maryland, April 2002.


Chuang SH. 1) Malformation of the Pediatric Spine. 2) Neuroimaging in Pediatric Epilepsy. Department of Diagnostic Radiology, Tuen Mun Hospital, Oct. 27th - Nov. 2nd.


Daneman A. 1) Intussusception: Issues and controversies related to diagnosis and reduction. 2) An approach to imaging the acute abdomen in pediatrics. 3) Cross-sectional imaging of the gastrointestinal tract in pediatrics. 4) Imaging of the adrenal in infants and children. XXVI nacional congreso colombiano de radiologia Cartagena, Colombia, August 16-19, 2001. Visiting Professor Invited Luis Fernado Uribe Lecturer

Daneman A. Guest Lecturer, Faculty of Radiology, College of Physicians and Surgeons, Ireland Dublin, Ireland, October 5-6, 2001

Daneman A. Pediatric Radiology Course - Evolution of the management of intussusception in children (4x - 75 minute lectures), Guest Faculty 34th annual international diagnostic course in davos. Davos, Switzerland, April 5 and 6, 2002

Daneman A. Abdominal Imaging Course - An approach to imaging the acute abdomen in children (10x - 75 minutes lectures), Guest Faculty 34th annual international diagnostic course in davos. Davos, Switzerland, April 5 and 6, 2002

Daneman A. 1) Congenital bowel obstruction: Etiology, imaging, management and pathology; 2) Cross-sectional imaging of the gastrointestinal tract in children; 3) Disappearing masses of the abdomen in fetuses, neonates and infants; 4) An approach to imaging the acute abdomen in children; 5) The evolution of intussusception management in children with emphasis on issues and controversies, pathologic lead points and perforation; 6) Recent advances of chest imaging in fetuses and neonates. Jornada paulista de radiologia 32nd annual meeting, ao Paulo, Brazil, April 27-30, 2002


Gaetz WC, Bosnyak DJ, Roberts LE, Pang LW, Cheyne D. The search for high frequency (~600 Hz) somatosensory responses to mechanical stimulation in humans. Annual meeting of Neuroscience, New Orleans, USA. (2001)

Gilday D. 1) Read with the Experts; 2) Controversial Issues in MSK. The 49th Society of Nuclear Medicine Annual Meeting, Los Angeles, California, June 15-19, 2002


Jabs DK, Samuels TS, Wright B, Jong RA. Is there a role for vacuum-assisted biopsies? American Roentgen Ray Society, Atlanta, Georgia May 2, 2002


Noseworthy MD. Title: Advanced Neuromaging Using MRI. IWK Children’s Hospital, Department of Diagnostic Imaging, Halifax, Nova Scotia, Canada. May 31/2002


Oudjhane K. "Biphosphonate therapy in childhood Osteoporosis: Radiographic and Densitometric considerations" The International Skeletal Society 28th Annual Refresher Course Quebec City, QC, CANADA September 5-8 2001


Ranson M. Instructional Course: Musculoskeletal MRI Pediatric Arthropathies American Roentgen Ray Society May 1, 2002 Atlanta, Georgia


Shroff MM. Imaging of CNS infection, University of Michigan, Ann Arbor, September 2001

Shroff MM. Imaging of Epilepsy in children: Hinduja Hospital & Medical Research Center, Mumbai, 24th July 2002

Shroff MM. Interesting pediatric neuroradiology cases – Resident teaching: Bombay Hospital and Institute of Medical Sciences, Mumbai, 18th July 2002

Shroff MM. Newer Advances in Neuroimaging: Holy Family Hospital, Mumbai, 25th July 2002


Sinus Pericranii: our experience at the Hospital for Sick children; C. Hiew, D. Armstrong, R.P.Humphreys, M. M. Shroff, N. A. Chuang; presented as a scientific exhibit at the American Society of Neuroradiology at Vancouver, May 2002


Temple M. Ultrasound guided interventions in the musculoskeletal system. ARRS, Atlanta, Georgia, April/May, 2002.


Valsangiacomo ER, Hornberger LK, Barrea C, JF, Yoo SJ. Partial and total Anomalous pulmonary venous connection in the fetus: Two-dimensional and Doppler echocardiographic findings. Presented at the Scientific Meeting of the European Society of Pediatric Cardiology in Porto, May 2002.

VanDijk M, terBrugge K, Willinsky RA, Wallace C. Reappraisal of the natural history of aggressive cranial dural AVFs. 5th Joint Annual Meeting of the AANS/CNS Section of Cerebrovascular Surgery and ASITN. Dallas, Texas. February 3-6, 2002.

VanDijk M, terBrugge K, Willinsky RA, Wallace C. Multimodality management of spinal dural AVFs with long-term follow up. 5th Joint Annual Meeting of the AANS/CNS Section of Cerebrovascular Surgery and ASITN. Dallas, Texas. February 3-6, 2002.


Welcome to Dr. Timothy Roberts

The Department is pleased to welcome Tim Roberts, PhD, who was recruited Jan 2002 from the University of California, San Francisco. Tim has assumed the mantle of Director of Research and Deputy Chair of the Department.

Dr. Roberts attained his PhD. in MRI physics from the Cambridge University, England in the Herschel Smith Laboratory for Medicinal Chemistry in 1991. As a postdoctoral fellow in the Neuroradiology section at the University of California San Francisco, in the laboratory of John Kucharczyk and Mike Moseley, he focused on the quantitative use of high speed perfusion- and diffusion sensitive MRI in animal models of cerebral ischemia, metabolic encephalopathies and neonatal development. Dr. Roberts later went on to research the role contrast media in imaging physiologic functions, as well as cellular and vascular response of perfusion-sensitive and BOLD MRI. In 1994 he was appointed Assistant Professor of Radiology at UCSF and co-founded the Biomagnetic imaging Laboratory (BIL) studying electrophysiologic aspects of brain function. Dr. Roberts became director of the BIL and went on to develop one of the largest Clinical Brain mapping sites in the USA. In 1999 he co-founded the Combined MR-Xray angiography suite where he was director until is arrival here at the University of Toronto.

The Research Program

Many of the faculty, residents, and fellows in the Department of Medical Imaging devote considerable effort to research. Research is an important mission of the Department of Medical Imaging. The nature of this research depends primarily on the interest and expertise of individuals and on resources at particular hospitals. In addition, the department promotes certain research topics, including the development and evaluation of imaging methods, such as magnetic resonance (MR) imaging, percutaneous and transvascular treatment methods, use of contrast agents, and most recently, minimally-invasive diagnosis and therapy.

Approximately eight years ago, an aggressive program to enhance research within the Department was initiated. The Research Program was created in 1992 with two main objectives:

- to encourage more faculty to participate in research related to radiological observations and procedures;
- to allow at least a few of the faculty to perform intensive medical imaging research

The two objectives are being pursued through several initiatives, involving contributions to the salary of a small number of faculty, shared access to certain resources, and an annual forum for highlighting research accomplishments. A synopsis of the key initiatives is presented below. Also included below are the research grants and publications of the faculty who are not listed with one of the affiliated hospitals.
The Medical Imaging Research and Development Awards (Protected Research Time)

The Medical Imaging Research and Development Awards have been our most successful initiative. These awards allow a select group of radiologists to devote at least one day each week to a particular research project. The Awardees in 2001-2002 were:

<table>
<thead>
<tr>
<th>Award Holder</th>
<th>Hospital</th>
<th>Project Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murray Asch</td>
<td>UHN/MSH</td>
<td>Safety and Effect of Percutaneous Temporary Portal Vein Occlusion on the size of a thermal lesion in Porcine livers</td>
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<tr>
<td>Mostafa Atri</td>
<td>SWCHSC</td>
<td>Accuracy of unenhanced (No IV, rectal, or oral contrast) helical CT and added value of enhanced helical CT in the assessment of acute abdomen</td>
</tr>
<tr>
<td>John Clark</td>
<td>SWCHSC</td>
<td>Non-lethal murine vascular imaging</td>
</tr>
<tr>
<td>Richard Farb</td>
<td>UHN/MSH</td>
<td>Follow-up evaluation of GDC treated aneurysms: Comparison of ATECO MRA, 3D time of flight and IADSA</td>
</tr>
<tr>
<td>Alan Fox</td>
<td>SWCHSC</td>
<td>3D Cone beam CT for acute cervical spine and facial trauma</td>
</tr>
<tr>
<td>Masoom Haider</td>
<td>UHN/MSH</td>
<td>MRI and CT dynamic enhancement in carcinoma of the uterine crevix: Correlation with direct interstitial fluid pressure measurement and tumor oxygen levels</td>
</tr>
<tr>
<td>Roberta Jong</td>
<td>SWCHSC</td>
<td>American College of Radiology Imaging Network, ACRIN 6652, Digital vs screen-film mammography</td>
</tr>
<tr>
<td>Korosh Khalili</td>
<td>UHN/MSH</td>
<td>Preoperative staging of cholangiocarcinoma: A prospective comparative study of sonography and MRI</td>
</tr>
<tr>
<td>Naeem Merchant</td>
<td>UHN/MSH</td>
<td>Effects of ACE inhibitor and beta blocking therapy in patients with systemic right ventricles</td>
</tr>
<tr>
<td>Derek Muradali</td>
<td>UHN/MSH</td>
<td>Contrast enhanced sonography of breast nodules and lymph nodes: Vascular morphology and pathologic correlation</td>
</tr>
<tr>
<td>Martin O'Malley</td>
<td>UHN/MSH</td>
<td>Hepatocellular carcinoma: Features on triphasic CT using a multidetector helical CT scanner</td>
</tr>
<tr>
<td>Dawn Pearce</td>
<td>SMH</td>
<td>The role of weight-bearing CT scan of the foot in pes planus</td>
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In addition to the The Medical Imaging Research and Development Awards, the department provides substantial salary support to allow three additional radiologists to devote 50% of their time to research. Last year these were: Dr. David Mikulis, Dr. Shi-Joon Yoo, and Dr. Stephanie Wilson.

**RSNA Resident/Fellow Research Award**

The RSNA Research and Education Fund offers an award annually to recognize and encourage outstanding residents and fellows in radiology research. The award is for one resident or fellow in each training program in North America who is deemed to have participated meaningfully in research during the previous year. Dr. James Scott was selected for this Award in 2001-2002.
Research Day

Our Annual Research Day was held on April 15, 2002. It consisted of a record number of presentations from senior residents, the faculty with The Medical Imaging Research and Development Awards, and many other members of the department. The presentations are listed by title at the end of this section.

Positron Emission Tomography Centre, Centre for Addiction and Mental Health

The University of Toronto Positron Emission Tomography (PET) Centre is under the direction of Dr. Sylvain Houle. Investigations concentrate on schizophrenia, mood and anxiety disorders, cognitive neuroscience, aging and dementia, movement disorders, and PET methodology.

Imaging/Bioengineering Research, SWCHSC

Imaging research is a major focus of the Imaging/Bioengineering Research group at Sunnybrook and Women’s College Health Sciences Centre (SWCHSC). Scientists in this group have University of Toronto appointments in the Department of Medical Biophysics, or the Department of Medical Imaging, or both. The faculty in this group make use of exceptional resources for research at SWCHSC and conduct research involving x-ray, nuclear medicine, magnetic resonance, and ultrasound technology. This group is internationally recognized for its excellent graduate student program.

Faculty List
(Academic Rank as of July 1, 2002)

John A. Rowlands Professor Senior Scientist, SWCHSC
Michael L. Wood Professor MR physicist
Martin J. Yaffe Professor Senior Scientist, SWCHSC
Sylvain Houle Associate Professor Director, PET Centre Centre for Addiction and Mental Health
Tim Roberts Associate Professor Director, Research Program, UHN
Curtis B. Caldwell Assistant Professor Physicist, SWCHSC
Adrian Crawley Assistant Professor MR physicist, TWH
Christopher MacGowan Assistant Professor MR physicist, HSC
Michael Noseworthy Assistant Professor MR physicist, HSC
George Tomlinson Assistant Professor Biostatistics
Members of the Department of Medical Imaging (underlined) were investigators on the following grants, identified by the principal investigator, other investigators, project title, sponsor, total amount of grant, and start and end dates of the funding period.


Henkelman RM, Bronskill MJ, Burns PN, Foster FS, Plewes DB, Rowlands JA, Wright GA, Yaffe MJ, Medical Imaging for Cancer, NCI Canada (Terry Fox Program Project), $C 1,425,844 pa, 07/01/01 - 06/30/06

Macgowan CK and Noseworthy MD. Computing Infrastructure for Pediatric Imaging Research, Sun Microsystems Canada equipment competition. Approximate value: $250,000. Date Awarded: 03 / 2002

Pisano ED, Yaffe MJ, et al, Trial of Digital Mammography versus Screen-Film Mammography, US National Institutes of Health/ACRIN CA80098, $208,900 USD, 06/01/01 - 05/30/04


Rowlands JA, N Robert, S Fort, Image Guided Optimisation of X-ray Cardiac Angiography, Canadian Institutes of Health Research (Operating Grant), $C 75,121, 01/10/2002 – 30/09/2005

Rowlands JA, + 9 Co-applicants, Imaging Research Centre for Cardiac Interventions, Ontario Innovation Trust, $C 6,109,294 total, 06/2002 - 06/2005

Rowlands JA, + 9 Co-applicants, Imaging Research Centre for Cardiac Interventions, Canadian Foundation for Innovation (Innovation Fund), $C 6,109,294 total, 02/2002 - 02/2005

Roberts TPL, National Alliance For Autism Research (NAAR), P.I., "Neural correlates of phonological processing in individuals with autism" 7/01-6/03, $ 96,273

Roberts, TPL. Canada Research Chair in Imaging Research. $500,000. 1/2002-12/2006
Publications

(a) Peer-Reviewed:


Noseworthy MD, Ackerley C, Qi X, Wright GA., Correlating subcellular contrast agent location from dynamic contrast-enhanced magnetic resonance imaging (dMRI) and analytical electron microscopy. Acad Radiol. 2002 Aug;9 Suppl 2:S514-8.


(b) Books or Book Chapters


Original Scientific Presentations

(a) Peer-Reviewed


(b) Non-Reviewed


Gaetz WC, Bosnyak DJ., Roberts LE., Pang LW. and Cheyne D. The search for high frequency (~600 Hz) somatosensory responses to mechanical stimulation in humans. Annual meeting of Neuroscience, New Orleans, USA. (2001)

Invited Papers and Professorships


Roberts T. Jan 02: “Permeability Mapping” and “Neuro-Interventional XMR”, Philips Neuro Users Meeting, Groenendael, Holland

Roberts T. Mar 02: (UCSF CME course). "Advanced neuroimaging techniques" (2 lectures), Vail, CO

Roberts T. Mar 02: (UCSF CME course). “Advances in MRI Methods”, 2\textsuperscript{nd} CT/MR Perfusion Symposium, San Francisco, CA

Roberts T. April 2002. Visiting Professor. AKH Vienna, Austria.

Roberts T. May 02: “High Field MR: Promises and Opportunities”, Opening ceremony University Hospital Bonn, Germany

Awards and Honors


Teaching -- Hours of Lectures

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Students</th>
<th>Residents, Fellows, Faculty</th>
<th>Technologists</th>
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<tbody>
<tr>
<td>C.B. Caldwell</td>
<td>10</td>
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<td>2</td>
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<tr>
<td>S. Houle</td>
<td>10</td>
<td>20</td>
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<tr>
<td>J.A. Rowlands</td>
<td>2</td>
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<tr>
<td>M.L. Wood</td>
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<tr>
<td>M.J. Yaffe</td>
<td>10</td>
<td>38</td>
<td>3</td>
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</tbody>
</table>
**Department of Medical Imaging Annual Research Day 2002**

Date: Monday, April 15, 2002  
Location: Sadowski Auditorium, 18th floor of the Mount Sinai Hospital  
Starting Time: 1:00 pm with welcome from Dr. Walter Kucharczyk

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:05</td>
<td>Ricardo Faingold</td>
<td>Bowel Viability Assessment by Color Doppler Sonography in Necrotizing Enterocolitis</td>
</tr>
<tr>
<td>1:15</td>
<td>Fred Lan</td>
<td>Subcapsular Steatosis and Steatonecrosis of the Liver in Response to Intraperitoneal Insulin: Imaging Features and Prevalence</td>
</tr>
<tr>
<td>1:25</td>
<td>Mostafa Atri</td>
<td>Accuracy of Unenhanced CT and the Added Value of Rectally Enhanced CT for the Assessment of Acute Right Lower Quadrant Pain and the Impact of Different Levels of Reviewers' Expertise</td>
</tr>
<tr>
<td>1:35</td>
<td>Masoom Haider</td>
<td>Comparison of Kinetic Parameters Derived from Dynamic Contrast-Enhanced CT and MRI of Cervix Cancer</td>
</tr>
<tr>
<td>1:45</td>
<td>Roberta Jong</td>
<td>ACRIN 6652 Digital Mammography Imaging Screening Trial</td>
</tr>
<tr>
<td>1:55</td>
<td>Jillian Pugh</td>
<td>Sentinel Lymph Node Biopsy in Breast Carcinoma: Comparison of Two Injection Techniques</td>
</tr>
<tr>
<td>2:05</td>
<td>Robert Yu</td>
<td>HRCT of Pulmonary Capillary Hemangiomatosis and Pulmonary Hypertensive Arteriopathy</td>
</tr>
<tr>
<td>2:15</td>
<td>Tarang Sheth</td>
<td>Delayed Myocardial Enhancement in Hypertrophic Obstructive Cardiomyopathy Post-Septal Ethanol Ablation</td>
</tr>
<tr>
<td>2:25</td>
<td>Kelvin Lee</td>
<td>Hepatocellular Carcinoma: Features on Triphasic CT using a Multidetector Helical CT Scanner</td>
</tr>
<tr>
<td>2:35</td>
<td>Danny Rappaport</td>
<td>Screening of a High Risk Inpatient Population for Unsuspected Pulmonary Embolism using Multi-Detector Row CT</td>
</tr>
<tr>
<td>2:45</td>
<td>Andréa S. Doria</td>
<td>Impact of High-Resolution US Transducers on the Visualization of a New Pattern of Splenic Parenchyma in Children: Clinical-Pathological Correlation of the Reticulonodular Pattern</td>
</tr>
<tr>
<td>2:55</td>
<td>Dawn Pearce</td>
<td>Weight-Bearing CT of the Feet</td>
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</tbody>
</table>

**Intervention**  
Moderator: Murray Asch

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>3:20</td>
<td>Murray Asch</td>
<td>Safety and Effect of Percutaneous Temporary Portal Vein Occlusion on the Size of Thermal Lesions in Porcine Livers</td>
</tr>
<tr>
<td>3:30</td>
<td>John Kachura</td>
<td>Incidence and Management of Complications Associated with Radiofrequency Ablation of Hepatic Tumors</td>
</tr>
<tr>
<td>3:40</td>
<td>Sheila Chou</td>
<td>Preoperative Portal Vein Embolization – Experience with Embospheres</td>
</tr>
<tr>
<td>3:50</td>
<td>Jonathan Jones</td>
<td>Cholangiographic Appearances of “Masquerading” Klatskin Tumours</td>
</tr>
<tr>
<td>4:00</td>
<td>Nikunj Patel</td>
<td>Cephalic Arch Stenosis in Native Hemodialysis Fistulae: Prevalence and Outcome Following Percutaneous Therapy</td>
</tr>
<tr>
<td>4:10</td>
<td>Marty Simons</td>
<td>The Woggle Technique: A New Method of Suture Closure of Hemodialysis: Arteriovenous Grafts and Fistulae, After Percutaneous Interventions</td>
</tr>
<tr>
<td>4:20</td>
<td>Marc Ossip</td>
<td>Fine Needle Aspiration of Thyroid Nodules that had Previously Insufficient Cytology</td>
</tr>
</tbody>
</table>

**Neuroimaging**  
Moderator: Tim Roberts

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>4:45</td>
<td>Tim Roberts</td>
<td>XMR - A Multimodality Approach to Interventional Radiology</td>
</tr>
<tr>
<td>4:55</td>
<td>Tom Marotta</td>
<td>An Endovascular Clip for Cerebral Aneurysm Treatment</td>
</tr>
<tr>
<td>5:05</td>
<td>Vincent Shin</td>
<td>Can Plain Radiographic Technique be used as a Predictor of Intracranial Aneurysm Recurrence Treated with Guiiglielmi Detachable Coils?</td>
</tr>
<tr>
<td>5:25</td>
<td>David Mikulis</td>
<td>Mapping Improved Cerebrovascular Reactivity (CVR) following Revascularization in Moyamoya Disease using Dynamic Modulation of End Tidal CO2 and BOLD MRI</td>
</tr>
<tr>
<td>5:35</td>
<td>Nat Chuang</td>
<td>Pediatric Localization-Related Epilepsy: Pre-Operative Magnetic Source Imaging and Neuropathology</td>
</tr>
<tr>
<td>5:45</td>
<td>Manu Shroff</td>
<td>Spinal Osteoid Osteoma and Osteoblastomas: The Significance of Parasosseous Soft Tissue Changes</td>
</tr>
</tbody>
</table>

5:55 Walter Kucharczyk  
Closing remarks
RESIDENT TRAINING PROGRAM

General Description

There were 46 residents in our program in the 2001-2002 year. The five-year program consists of one year of preliminary clinical training (PGY1), followed by four years of training in medical imaging.

The university-wide integration and rotational system ensures that each resident will have access to all the strengths of our large and expert faculty and the huge volume of clinical pathology. Residents have the opportunity to train at several large modern hospitals, doing so in groups of 5 – 10 trainees of all levels, thus maintaining a close working environment with peers and faculty. All hospitals are equipped with state-of-the-art equipment. Residents work daily with the best of general radiographic, ultrasound, CT and MRI technology. Several hospitals have digital image archiving and communication systems.

PGY1

PGY1 Clinical training is divided into two blocks, one eight-nine month block at core teaching hospitals and a two-three month block at a community hospital. During 2001 - 2002, the core teaching hospitals have been the Mount Sinai Hospital and the St. Michael’s Hospital. Community training is principally done at the North York General Hospital. The content of the PGY1 program included Medicine (General Medicine and Respirology); Surgery (General Surgery, Orthopaedics, Urology, Neurosurgery, Obstetrics and Gynaecology); one month of Paediatrics; one month of Anatomy at the U of T Anatomy Department; and two months of elective choices. In the final month of PGY1, all residents come together for a Radiology Orientation Program, which introduces the trainees to physics, imaging equipment, clinical lectures, program issues and the core hospitals. The PGY1 rotation opportunities are reviewed annually, attempting to make the best of training choices in the clinical services.

PGY2

This is the first year of training in medical imaging. During 2001 - 2002, a PGY2 trainee spent the entire year at one or two of the three core teaching Departments (Mount Sinai – University Health Network, Sunnybrook and Women’s College Health Sciences Centre and St. Michael’s Hospital). There is a graduated increase in responsibility over the course of the year. In order to prepare residents to take night call (which starts in September), the year begins with a 10 week introductory program covering thoracic, GI, GU, CNS, MSK, CT and nuclear imaging. The remainder of the year consists of one or two month rotations in each of the above organ systems, as well as a one-month rotation in ultrasound.
PGY3

In 2001 - 2002, residents in this training year divided their rotations into three to six month blocks at hospitals different from that of their PGY2 training year. This allows the trainee an opportunity to see a different spectrum of pathology and to work with a different group of faculty. Rotations during the PGY3 year have included Breast Imaging, Neuroradiology, Ultrasound, Vascular-Interventional, and Nuclear Medicine as well as additional training in CT, MSK, GI and Chest. MRI training is included within all organ system rotations and is a strong component of all core hospitals.

PGY 4

During this year, each resident spent a four-month block in Paediatric Radiology at the world famous Hospital for Sick Children. The other eight months is at one or two of the core hospitals. This year includes a two-month block of dedicated Angio-Interventional training. The resident also has four to six months of General Radiology rotations. The Armed Forces Institute of Pathology (AFIP) six-week rotation for Radiology-Pathology is scheduled during the General radiology time.

PGY5

The resident is usually allowed to use this year for electives, but this is conditional upon the resident having achieved an acceptable standard of competence in medical imaging. It may be spent concentrating on areas of relative weakness, or on subspecialty areas. Most residents include electives in obstetric ultrasound, cardiac imaging and Body MRI in this final year.

Armed Forces Institute of Pathology

All residents are encouraged to attend the Armed Forces Institute of Pathology in Washington, D.C., where they receive a six-week, intensive, didactic course in pathology correlated to imaging. This generally occurs during the PGY4 year. Some financial support is available. To date, we have been successful in reserving a sufficient number of positions at AFIP to permit all of our residents to attend at some point in their training.

Physics Instruction

All residents must be knowledgeable about the physics of medical imaging. To that end, intensive physics instruction is provided. One week courses are provided for the PGY1 and PGY3 years and there is also a five-day review course in the PGY3 or PGY4 year of training. These courses are organized by Martin Yaffe, Ph.D. (Department of Medical Imaging) and taught by the faculty of our department, the faculty of the Department of Medical Biophysics, and guest speakers.
Conferences

Residents are encouraged to attend imaging conferences, both to be involved in presenting papers or posters and also for the benefit of knowledge and interaction with the imaging community at large. During the PGY3 year, each resident is given the opportunity to attend a major imaging conference with the provision of financial support. The resident is not required to present at the conference to receive this support but does prepare a report following the meeting to highlight what they gained in their attendance. In addition, residents presenting papers or posters at recognized meetings generally receive financial support through affiliations with hospital imaging departments.

Seminars and Half-Day Program

Wednesday afternoons from September to June have been the focus for the academic program. There is a formal two to three hour weekly clinical seminar for PGY1, PGY2 and PGY3 residents. Most seminars are organized around organ systems and imaging modalities.

As well, there are special sessions for all resident years on non-clinical topics such as ethical and legal issues, practice management and career planning. Speakers from outside the Department add interest to the content of these featured sessions.

A 10 hour review series is provided for PGY5 residents each spring in preparation for the ABR and Royal College examinations.

Research

Residents in Medical Imaging are required to have a good foundation of research methodology and critical appraisal in order to either critically evaluate scientific medical literature or pursue independent research activities. Principles and issues of health technology assessment, quality improvement and clinical audits are also core components of the clinical research curriculum. Dr. George Tomlinson, statistician, has recently joined the Department, and with the resident Research Committee under Dr. David Mikulis, is responsible for the design and delivery of the course curriculum, workshops, tutorials and lectures on these topics. Instruction in this curriculum is given throughout the Residency Program. In total, residents in Medical Imaging receive over 30 hours of course instruction.

Each resident is required to become involved in a research project beginning no later than the PGY3 year. All residents receive protected time to work on their project. The research is conducted in conjunction with one or more staff persons with a view to presenting the project during the PGY4 or PGY5 years at our Annual Research Day. The residents are encouraged to publish their results and to present them at national or international meetings.
Rounds

Teaching rounds, or small group conferences, are held at each of the core hospitals once or twice a day. University Division rounds are held for the entire department six to eight times annually at a central location.

View Box Teaching

Every resident in the PGY2 through to the PGY5 years receives daily teaching from faculty at the view box and in the procedure rooms. Teaching is based on the day’s cases, but may be supplemented with related cases from faculty teaching files. The amount of teaching varies from rotation to rotation but on average there are one to two hours of this type of one-to-one teaching daily. This program is widely recognized for the quality of teaching provided to residents. In addition, residents learn to teach others and are expected to teach students and observers in the Department.

Journal Club

This is organized by the residents and is held approximately five times annually.

Visiting Professor Program

This program of six lectures between October and April is organized by the CME Director of our department and is provided for all imaging specialists including community radiologists. Residents attend the lecture and reception. Visiting Professors from outside Toronto usually present resident teaching sessions at two or three of the teaching hospitals during their visits to Toronto.

Organ Imaging Review Course

This is a week-long, internationally recognized review course. It is given in September or October of each year. It is primarily intended as a CME course for practicing radiologists but also contains a wealth of valuable teaching material for residents. All residents are given some time off clinical services to attend, and can do so at no cost.

Program Evaluation

In addition to that carried out by the Radiologists-in-Chief and the teaching co-ordinators at each hospital, the residents complete an assessment of each rotation, and an annual assessment of the faculty’s teaching.

Program Supervision

This is the direct responsibility of the Program Director who is, in turn, responsible to the Departmental Chair and the Departmental Executive Committee. The Program Director is assisted by the Resident Training Committee, which is composed of a representative from each
of the teaching hospitals, a PGY1 coordinator responsible for all PGY1 issues, as well as from Nuclear Medicine and the Research Committee. In addition, the University of Toronto Chief Resident in Medical Imaging and a resident representative from each year of training are full members of the committee.

There are Division Heads appointed for Cardiothoracic, Musculoskeletal, Abdominal, Pediatric, Vascular-Interventional, Breast Imaging and Neuroradiology. These Division Heads and the Program Director for Nuclear Medicine are responsible for rotation goals and objectives, suggested reading lists and recommendations regarding the resident lectures and seminars. Division Heads advise the Program Director and Resident Training Committee.

Resident Evaluations

- Evaluation consists of the following:
- An in-training evaluation completed following each rotation.
- A summary in-training evaluation at the end of each year of training.
- Results of the American College of Radiology multiple choice in-training examination, taken in the spring of each year.
- Results of a yearly oral examination based on the Royal College format (PGY2-5).
- Results of a written examination in physics following the PGY1 course.
- A practice OSCE examination in the spring of each year (PGY3-5).

Resident Awards

Outstanding residents are recognized by awards for clinical excellence, teaching and research.

1) Gordon Potts Award

This award of a commemorative plaque is made to the outstanding final-year resident, based on a combination of the following academic and personal strengths: Interpersonal skills, willingness to explore new methods and ideas, dedication to patient service and academic activities, intellectual capacity and publications in residency.

2001 – 2002 co-recipients: Dr. Elizabeth David, PGY5; Dr. Teresa Loucks-Gray, PGY5

2) Resident Teacher-Mentor Award

This award will be made to a final year graduating resident, based on a combination of the following strengths and contributions: dedication to teaching, resident advocate and mentor, contribution to Resident Program and commitment to personal continuing educational growth.

2001 - 2002 winner: Dr. Nir Stanietzky, PGY5
3) **Research Awards**

Each year residents as well as fellows are nominated to receive the RSNA Research Award for Research excellence within the University of Toronto Department of Medical Imaging.

2001 – 2002 winner: Dr. James Scott

**Summary**

The University of Toronto training program in Medical Imaging is designed to provide the best possible training in all aspects of imaging. The program is an intensive one, with considerable emphasis on teaching, in addition to exposure to a huge volume of clinical pathology. The university-wide integration and rotational system ensures that each resident will have access to all of the strengths of our departments.
RESIDENTS

PGY1 Level

Gagan Ahuja, MD
University of Toronto, 2001
Harpreet Baweja, MD
McMaster University, 1994
Richard Bitar, MD
University of Toronto, 2001
Louis-Martin Boucher, MD/PhD
University of Toronto, 2001
Debra Chang, MD
University of Toronto, 2000
Meaghan Hyland, MD
University of Ottawa, 2001
Jeffery Jaskolka, MD
University of Western Ontario, 2001
Ryan Margau, MD
University of Toronto, 2001
Elaine Martinovic, MD
University of Calgary, 2001
Matthew McInnes, MD
University of Toronto, 2001
Rola Shaheen, MD
University of Jordan, 1996

PGY2 (R1) Level

Susan Armstrong, MD
University of Toronto, 2000
Debra Chang, MD
University of Toronto, 2000
Marc Freeman, MD
University of Toronto, 2000
Aaron Glickman, MD
University of Western Ontario, 2000
Anish Kirpalani, MD
McMaster University, 2000
Sarah Koles, MD
University of Calgary, 2000
Vikash Prasad, MD
Dalhousie University, 2000
Michael Stefanos, MD
University of Toronto, 2000
PGY3 (R2) Level

Peter Ballyk, MD  
University of Toronto, 1999
Carrie Betel, MD  
University of Toronto, 1999
Anita Chae, MD  
University of Western Ontario, 1999
Zdenko Filakovic, MD  
Ontario International Medical Program, 1999
Angela Ho, MD  
University of Toronto, 1999
Zeinab Layton, MD  
University of Western Ontario, 1999
Selina Lem, MD  
Queen’s University, 1999
Bonnie O’Hayon, MD  
University of Toronto, 1999
Markian Shulakewych, MD  
University of Manitoba, 1994
Steven Singer, MD  
University of Ottawa, 1998
Sameh Tadros, MB, BCh  
Ontario International Medical Program, 1999
Lana Wilkinson, MD  
McMaster University, 1999

PGY4 (R3) Level

Frederick Lan, MD  
University of Toronto, 1998
Erika Mann, MD  
Queen’s University, 1998
Marc Ossip, MD  
University of Toronto, 1998
Jillian Pugh, MD  
Dalhousie University, 1998
Tarang Sheth, MD  
University of Toronto, 1998
Vincent Shin, MD  
University of Ottawa, 1998
Robert Yu, MD  
University of Toronto, 1998
PGY5 (R4) Level

Hilarie Broom, MD
   University of Ottawa, 1997
Elizabeth David, MD
   University of Toronto, 1997
David Jacobs, MD
   Queen’s University, 1996
Jae Koul Kim, MD
   University of Toronto, 1997
Teresa Loucks, MD
   University of Ottawa, 1997
Nikunj Patel, MD
   Queen’s University, 1997
Anoosh Sharif, MD
   University of Western Ontario, 1997
Nir Stanietzky, MD
   University of Ottawa, 1997
NUCLEAR MEDICINE TRAINING PROGRAM

General Description

Nuclear medicine is a branch of medical practice primarily concerned with the use of unsealed radioactive sources in the study, diagnosis, and treatment of disease. Our program currently provides dual-certification in radiology and nuclear medicine. This is a six year (including PGY1) program with two years of subspecialty training in nuclear medicine (provided that the subspecialty training is taken following the completion of at least 18 months in Diagnostic Radiology, effective June 1, 1998).

The Nuclear Medicine Program provides formal instruction and training for both radiology and nuclear medicine residents. Formal lectures cover various aspects of nuclear medicine including cardiac and oncologic nuclear medicine, functional neuroimaging, radiopharmacy, nuclear physics, and general nuclear medicine. Residents have specific goals, objectives and reading lists during their rotation at one of the teaching hospitals. There are weekly or biweekly teaching rounds for both radiology and nuclear medicine residents at these hospitals. Also, there are city-wide nuclear medicine rounds held every Friday morning at the Hospital for Sick Children. The residents acquire skills by participating in daily clinical work. Didactic instruction is supplemented by teaching files at each hospital. In addition, there are monthly teaching rounds during the academic year at Mount Sinai Hospital. These rounds are given by internationally renowned guest speakers, who also present evening lectures on current topics in nuclear medicine at the Toronto Nuclear Medicine Society Meeting.

The Nuclear Medicine Program is actively involved in clinical and basic science research including functional neuroimaging with SPECT and PET, cardiac, oncologic, and pediatric nuclear medicine, and radiochemistry. Residents are encouraged to participate in these research activities.

General Objectives

The goal of the nuclear medicine resident is to be able to function independently as a medical specialist with the ability to advise on, supervise, perform, and interpret all diagnostic procedures, and to achieve a level of competence in the performance of radiotherapy with unsealed radioactive sources so as to act as a consultant to referring physicians. The resident must acquire excellent communication and technical skills, and the knowledge and professionalism appropriate to a lifetime career in nuclear medicine.

Dual Radiology and Nuclear Medicine Residency

Applicants will be considered from candidates who are already in the Diagnostic Radiology Training Program at the University of Toronto, usually, one slot per year is reserved for the dual certification program.
RADIOLOGY SCIENTIST TRAINING PROGRAM

Objectives

The purpose of the Radiological Scientist Training Program (RSTP) is to provide a small group of radiology residents with the opportunity to develop skills important to the pursuit of independent research. These skills encompass research methodology, publications, grant writing, and presentations. The research training is intended to complement the excellent clinical training for which the Department of Medical Imaging is already recognized.

Organization

The RSTP is a six-year program with two years of research and four years of clinical training. The Royal College of Physicians and Surgeons of Canada will accept one year of research towards fulfilling the requirements of the five year program in diagnostic radiology. The RSTP is able to accommodate as many as two residents per year. The first two years of the RSTP are identical to the regular radiology training program. The difference is in the PGY3 and PGY4 years which, in the RSTP, are entirely devoted to research. Research opportunities are available in many departments relevant to radiology. Under certain circumstances, residents in the RSTP may pursue a M.Sc. or Ph.D. degree. The final two years, PGY5 and PGY6, are designated for clinical training to fulfill the requirements of the Royal College of Physicians and Surgeons of Canada.

Eligibility and Application Procedure

Applications will be considered from candidates already accepted into the regular radiology training program and will occur during the PGY2 training year. A maximum of two places per year will be reserved for residents in the RSTP. Applicants need not have prior experience in research or a special background, but are expected to be self-motivated.

Remuneration

Residents in the RSTP will be remunerated commensurate with residents in the regular radiology training program, up to a maximum of the PGY5 level.

Selection of Research Project and Supervisor

Residents in the RSTP should select a project and a supervisor as soon as possible, and before the PGY3 year. The Director of Research and the Chair of the department can offer assistance with this selection. A supervisor may be selected from various University of Toronto departments, including Medical Imaging, Medical Biophysics, Anatomy, Physiology, Biochemistry, Computer Science, Clinical Epidemiology, or Electrical Engineering, specifically the Institute of Biomedical Engineering. The supervisor must have operating funds to support the research, but is not expected to provide remuneration for the resident. Candidates will be strongly encouraged also to apply for a fellowship from an agency such as the Medical Research...
Council, but acceptance into the RSTP will not be conditional upon success in obtaining such a fellowship.

**Graduate Degrees**

Residents in the RSTP are encouraged to pursue a graduate degree. The procedure depends somewhat on the department in which the research is to be conducted, but requires a separate application to that department and the School of Graduate Studies or Institute of Medical Sciences. Residents are responsible for fulfilling all requirements of the department in which they are registered as graduate students.

**Clinical Responsibilities**

During the two years of research training, residents in the RSTP will have minimal clinical responsibilities, probably limited to one on-call evening/night per week. In addition, residents in the RSTP are encouraged to maintain contact with clinical activities through attendance at select departmental rounds and teaching sessions. Such attendance will not be compulsory for RSTP residents in the two research years, as it is for residents in the regular training program.
OBJECTIVES OF TRAINING & SPECIALTY TRAINING
REQUIREMENTS IN DIAGNOSTIC RADIOLOGY

Definition

Diagnostic Radiology is a branch of medical practice concerned with the use of imaging techniques in the study, diagnosis and treatment of disease.

General Objectives

On completion of the educational program, the graduate physician will be competent to function as a consultant in Diagnostic Radiology. This requires the physician to have the ability to supervise, advise on and perform imaging procedures to such a level of competence, and across a broad range of medical practice, as to function as a consultant to referring family physicians and specialists.

Communication skills, knowledge, and technical skills are the three pillars on which a radiological career is built, and all are dependent on the acquisition of an attitude to the practice of medicine which recognizes both the need to establish a habit of continuous learning and a recognition of the importance of promoting a team approach to the provision of imaging services.

Residents must demonstrate the knowledge, skills and attitudes relating to gender, culture and ethnicity pertinent to Diagnostic Radiology. In addition, all residents must demonstrate an ability to incorporate gender, cultural and ethnic perspectives in research methodology, data presentation and analysis.

Specific Objectives

At the completion of training, residents will have achieved the following competencies so as to function effectively as:

i) Medical Expert/Clinical Decision-Maker

General Requirements

- Demonstrate diagnostic and therapeutic skills for ethical and effective patient care.
- Access and apply relevant information to clinical practice so as to have competence in clinical radiological skills.
- Demonstrate effective consultation services with respect to patient care, education and legal options.

Specific Requirements

- Understand the nature of formation of all types of radiological images, including physical and technical aspects, patient positioning, contrast media.
- Knowledge of the theoretical, practical and legal aspects of radiation protection, including other imaging techniques and their possible harmful effects.
• Knowledge of human anatomy at all ages, both conventional and multi-planar, with emphasis on radiological applications.

• Knowledge of all aspects of clinical radiology, including understanding of disease, appropriate application of imaging to patients, importance of informed consent, complications such as contrast media reactions, and factors affecting interpretation and differential diagnosis.

• Understand the fundamentals of quality assurance in radiology.

• Understand the fundamentals of epidemiology, biostatistics and decision analysis.

• Show competence in manual and procedural skills and in diagnostic and interpretive skills.

• Demonstrate the ability to manage the patient independently during a procedure, in close association with a specialist or other physician who has referred the patient. The radiologist should know when the patient’s best interests are served by discontinuing a procedure, or referring the patient to another physician.

• Understand the acceptable and expected results of investigations/and or interventional therapy as well as unacceptable and unexpected results. This must include knowledge of and ability to manage radiological complications effectively.

• Understand the appropriate follow-up care of patients who have received investigations and/or interventional therapy.

• Show understanding of a sound and systematic style of reporting.

• Competence in effective consultation, conduct of clinico-radiological conferences, and the ability to present scholarly material and lead case discussions.

ii) Communicator

• Establish appropriate therapeutic relationships with patients/families.

• Listen effectively.

• Obtain the appropriate information during consultation with referring physicians in order to be able to make recommendations regarding the most appropriate testing and/or management of patients.

• Discuss appropriate information with patients/families and the health care team, and be able to obtain informed consent for tests and procedures when this is needed.

Specific Requirements

• Have the ability to produce a radiological report which will describe the imaging findings, most likely differential diagnosis, and when indicated, recommend further testing and/or management.

• Understand the importance of communication with referring physicians, including an understanding of when the results of an investigation or procedure should be urgently communicated.

• Communicate effectively with patients and their families and have a compassionate interest in them.
- Recognize the physical and psychological needs of the patient and their families undergoing radiological investigations and/or treatment, including the needs of culture, race and gender.

iii) Collaborator

General Requirements
- Consult effectively with other physicians and health care professionals.
- Contribute effectively to other interdisciplinary team activities.

Specific Requirements
- Have the ability to function as a member of a multi-disciplinary health care team in the optimal practice of radiology.

iv) Manager

- Utilize resources effectively to balance patient care, learning needs, and other activities.
- Allocate finite health care resources wisely.
- Work effectively and efficiently in a health care organization.
- Utilize information technology to optimize patient care, life-long learning and other activities.

Specific Requirements
- Be competent in conducting or supervising quality assurance including an understanding of safety issues and economic considerations.
- Be competent in computer science as it pertains to the practice of radiology.

v) Health Advocate

General Requirements
- Identify the important determinants of health affecting patients.
- Contribute effectively to improve the health of patients and communities.
- Recognize and respond to those issues where advocacy is appropriate.

Specific Requirements
- Understand and communicate the benefits and risks of radiological investigation and treatment including population screening.
- Recognize when radiological investigation or treatment would be detrimental to the health of a patient.
- Educate and advise on the use and misuse of radiological imaging.

vi) Scholar

General Requirements
- Develop, implement and monitor a personal continuing education strategy.
- Critically appraise sources of medical information.
- Facilitate learning of patients, house staff/students and other health professionals.
- Contribute to development of new knowledge.
Specific Requirements

• Competence in evaluation of the medical literature.
• The ability to be an effective teacher of radiology to medical students, residents, technologists and clinical colleagues.
• The ability to conduct a radiology research project, which may include quality assurance.
• Appreciation of the important role that basic and clinical research plays in the critical analysis of current scientific developments related to radiology.

vii) Professional

General Requirements

• Deliver highest quality care with integrity, honesty and compassion.
• Exhibit appropriate personal and interpersonal professional behaviours.
• Practice medicine ethically consistent with the obligations of a physician respecting the needs of culture, race and gender.

Specific Requirements

• Be able to accurately assess one’s own performance, strengths and weaknesses.
• Understand the ethical and medical-legal requirements of radiologists.

Training in Canada

The foregoing represents the general and specific objectives that all candidates for the Royal College examinations in Diagnostic Radiology are expected to meet. For those training in Canadian programs, these objectives will be accomplished in a staged manner. Residents in Canadian programs may obtain the document describing this approach from their program directors.
SPECIALTY TRAINING REQUIREMENTS IN DIAGNOSTIC RADIOLOGY

These specialty training requirements apply to those who began training on or after 1 June 1997.

The five years of approved training require, at first, a closely supervised practice, with the opportunity for increasing responsibility in the final years, so that the resident near the end of training can function as a general radiology consultant, requesting help from staff radiologists when necessary. The residency may be followed by one or more years of fellowship training in a subspecialty discipline, as the residence training is not intended to provide a subspecialty level of expertise.

This period must include:

1) One year of basic clinical training:
The purpose of this year is to give the resident a degree of independent responsibility for clinical decisions; an opportunity for further development of the skills required in making effective relationships with patients; the consolidation of competence in primary clinical and technical skills across a broad range of medical practice; and an understanding of the nature of the relationship between a referring physician and a clinical radiological consultant.

2a) Three years of approved resident training in “general diagnostic imaging”, this must include:
Respiratory, cardiovascular, gastro-intestinal and biliary, genitourinary, musculoskeletal, mammography, neurological and pediatric radiology, as well as the following modalities: fluoroscopy, ultrasound, CT and MR imaging.
Because of the varying training programs in the recognized university training centres, these 36 months may be allocated as block periods of at least three months or their equivalents.

2b) One year of approved residency that may consist of one to twelve month periods in any of the following, as long as these are appropriately integrated by the Residency Training Committee:

- further training in diagnostic radiology
- diagnostic ultrasound
- CT
- MR
- nuclear medicine
- cardiac and/or vascular radiology
- interventional radiology
- neuroradiology
- pediatric radiology
- pathology or other clinical specialty relevant to the practice of radiology (for up to three months)
• a full-time research project, relevant to diagnostic imaging, and acceptable to the program director and the Credentials Committee.

NOTE: In view of the amount and variety of radiology to be covered and the skills required at the time of the final examination, it will seldom be appropriate to spend the entire 12 months of the fifth year in any one of these areas.
RESIDENT RESEARCH PROGRAM

While training in clinical radiology remains the main focus of the residency, research is considered to be of paramount importance as well. It is essential that residents gain experience in as many aspects of research as possible, including searching the literature, data analysis and manuscript preparation. A resident cannot know if he/she would enjoy an academic career without firsthand experience. The feeling of satisfaction that accompanies completion of a project, and contribution of information to the medical/scientific literature, can only be appreciated if personally experienced.

The Research Program consists of three aspects; a seminar series, resident support, and a formal presentation day.

Seminar Series

Residents in Medical Imaging are required to have a good foundation of research methodology and critical appraisal in order to either critically evaluate scientific medical literature or pursue independent research activities. Principles and issues of health technology assessment, quality improvement and clinical audits are also core components of the clinical research curriculum. Workshops, tutorials, and lectures on these topics are organized by the department’s epidemiologist who is responsible for the design and delivery of the course curriculum. Attendance at these sessions is compulsory and instruction of this curriculum is given throughout the Residency Program.

Support

Department faculty are asked to submit research topics from which residents may choose a project, which he or she finds interesting. The residents are given the opportunity to create their own topic or to choose one from this faculty-generated list. Residents are freed from clinical responsibilities for their work. Each resident presents a short, informal outline of the intended project to the Resident Research Committee in November of their PGY3 year so that project feasibility can be assessed before too much time has been devoted to it. Helpful suggestions are offered by Committee Members. Data collection for the project begins in January of the PGY3 year and extends to December of the same year. During June, the residents present an interim report, again informal, to the Committee, to confirm that data collection has begun and is progressing satisfactorily. In November/December the residents present a third informal discussion for assessment of project status and to determine if an abstract can be generated for submission to a national/international meeting. It is at this time that the Committee determines if the project is satisfactory. Incomplete studies may be considered satisfactory depending on the circumstances described by the resident. Finally, the study is presented formally in the following Spring at the Annual Research Day.
Presentation Day

Our 14th annual Department of Medical Imaging Research Day held at the Sadowski Auditorium, at the Mount Sinai Hospital on April 15, 2002 was the venue for excellent resident research presentations. Support for the event was provided by Nycomed Amersham (Canada) Inc. The presentations included:

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<tr>
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<th>Name</th>
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<tr>
<td>1.</td>
<td>Fred Lan</td>
<td>Subcapsular Steatosis and Steatonecrosis of the Liver in Response to Intraperitoneal Insulin: Imaging Features and Prevalence</td>
</tr>
<tr>
<td>2.</td>
<td>Jillian Pugh</td>
<td>Sentinel Lymph Node Biopsy for Breast Cancer: Comparison of Two Different Injection Techniques</td>
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<tr>
<td>3.</td>
<td>Robert Yu</td>
<td>HRCT of Pulmonary Capillary Hemangiomatosis and Pulmonary Hypertensive Arteriopathy</td>
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<td>4.</td>
<td>Tarang Sheth</td>
<td>Delayed Myocardial Enhancement in Hypertrophic Obstructive Cardiomyopathy Post-Septal Ethanol Ablation</td>
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<td>5.</td>
<td>Nikunj Patel</td>
<td>Cephalic Arch Stenosis in Native Hemodialysis Fistulae: Prevalence and Outcome Following Percutaneous Therapy</td>
</tr>
<tr>
<td>6.</td>
<td>Marc Ossip</td>
<td>Thyroid biopsies</td>
</tr>
<tr>
<td>7.</td>
<td>Vincent Shin</td>
<td>Can Plain Film Radiography Predict Recurrence in GDC Coiled Cerebral Aneurysms?</td>
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While presentation at this meeting is an end unto itself, many of the projects have since been presented at national and international meetings and have been published in peer-reviewed journals. Since the research program was instituted, 56 of the resident’s projects have appeared in peer-reviewed journals. Of those not published, many have been presented either orally or as a poster at national/international meetings.

Resident Research Awards

The faculty have observed that the research performed and presented by the residents was of high quality. Some of the residents have received awards recognizing outstanding research, therefore independently confirming the faculty’s impressions. The following is a list of such rewards obtained by the residents in the 2001-2002 academic year:

RSNA Resident/Fellow Research Award June 2002: James Scott
FELLOWSHIP PROGRAM

With access to several thousand inpatient beds, the affiliated hospitals of the University of Toronto form one of the largest teaching facilities in the world, thereby serving as an ideal setting for advanced subspecialty training in Medical Imaging. The program has national and international stature both clinically and in research, and attracts fellows from around the world.

In 2001-2002 the seven divisions of the University of Toronto Department of Medical Imaging offered a comprehensive array of fellowships:

- Abdominal Imaging
- Breast Imaging
- Cardiac Imaging
- Cross-sectional Imaging
- Magnetic Resonance Imaging
- Musculoskeletal Imaging
- Neuroradiology (Diagnostic)
- Neuroradiology (Interventional)
- Pediatric Imaging
- Thoracic Imaging
- Vascular/Interventional Radiology
- Women's Imaging
- Combined Clinical/Research

The flexibility of the program permits tailoring of the fellowship experience to accommodate most needs. Research is encouraged as an integral component of the fellowship program and to this end protected research time is available to all Medical Imaging fellows.

2001–2002 Department of Medical Imaging Fellows

Abdominal Imaging Fellows
- Giovanni Artho
- Turki Alfuhaid
- Margôt Brannigan
- Kartik Jhaveri
- Stefan Kriegler
- Enoch Lai
- Kelvin Lee
- Caitlin McGregor
- Ur Metser
- Andrea Miller
- Eric Sala

Breast Imaging Fellow
- Kavita Dhamanaskar
Cardiac Imaging Fellow
  - Yves Provost

Cross-sectional Imaging Fellows
  - James Haroun
  - Soe Lwin Kyone
  - James Meindok

Magnetic Resonance Imaging Fellow
  - Gilbert Chow

Musculoskeletal Imaging Fellows
  - Robert Bleakney
  - Raymond Kuan
  - Andoni Toms

Neuroradiology (diagnostic) Fellows
  - Ronit Agid
  - Jeffery Illman
  - Dipanka Sarma
  - James Scott

Neuroradiology (interventional) Fellows
  - Charles Haw
  - Seon-Kyu Lee

Thoracic Imaging Fellows
  - Eliahu Konen
  - Conor Murray

Vascular/Interventional Radiology Fellows
  - Sheila Chou
  - Christopher Guest
  - Jonathan Jones

Women's Imaging Fellows
  - Doris Jabs
  - Lydia Liao
  - Maximilian Ryan

Combined Clinical/Research Fellow
  - Nathaniel Chuang

Pediatric Imaging Fellows
  - Pedro Albuquerque
  - Joao Amaral
  - Andrea Doria
  - Ricardo Faingold
  - Chee-Yan Hiew
  - Christian Kellenberger
• Monica Epelman
• Osnat Konen
• Lisa Raviv-Zilka
• Ricardo Restrepo
• Manohar Shroff
UNDERGRADUATE PROGRAM

Year I Medicine

The first year medical program consists of three main contiguous block courses of study. These include Structure and Function, Metabolism and Nutrition and Brain and Behavior. Medical imaging participates in the Structure and Function and Brain and Behavior courses. This course teaches anatomy, histology, and cardio-respiratory physiology.

Structure and Function

This course teaches anatomy, histology, and cardio-respiratory physiology.

Anatomy - Radilogy Seminar

The anatomy radiology seminar series was extensively revised and standardized this past year. Ten lecturers gave a total of 24 hours of interactive seminars to the first year medical class using this new curriculum. These six seminars taught radiographic anatomy of the thorax, abdomen, pelvis-urinary tract, upper extremity, lower extremity and of the head and neck. Faculty lecturers participating in this seminar series included the following radiologists; Dr. Ray Chan, Dr. Wayne Dietel, Dr. Tim Dowdell, Dr. Nasir Jaffer, Dr John Kachura, Dr Walter Kucharczyk, Dr. Walter Montenera, Dr. Narindar Paul, Dr. Dawn Pearce and Dr. Bill Weiser.

Full Class Lecture - Imaging of the Lungs

Dr D. Rappaport delivered this one-hour lecture to the first year medical class.

Full Class Lecture - Imaging of the Bones and Muscles

Dr. J. Rubinstein delivered this one-hour lecture to the first year medical class.

Brain and Behavior

From time to time, the Department of Medical Imaging has provided tutors for the Brain and Behavior course. Neuroradiology teaching tools have been developed by members of the department of Medical Imaging and are used in this course on an ongoing basis.

Year II Medicine

Year II teaching centers around the two main programs in the Year II curriculum: The Pathobiology of Disease (the first half of the year), and The Foundations of Medical Practice (the second half of the year).
The Pathobiology of Disease Course

This fourteen-week course teaches pathology, immunology, genetics and other similar subjects. The Department of Medical Imaging has worked on an ongoing basis to develop and provide the medical imaging teaching resources required for delivery of this PBL. (Problem based learning), oriented curriculum.

Pathobiology of Disease - Imaging Case material

In past years, a series of images with annotations was exhibited on a viewer in the Medical Science Building. The content of this series roughly paralleled and/or emphasizes the imaging aspects of the material taught in the Pathobiology of Disease course. Efforts are currently under way, in cooperation with course organizers, to revise and update these cases using current imaging technology. In the near future, this case material will be presented to students in a web-based format.

Full Class Lectures: Chest Imaging

Dr. J. Crossin, at the beginning of the Pathobiology of Disease Course gave a full class lecture in chest imaging. This lecture included a review of the radiographic anatomy and pathophysiology of the lungs in lung disease. Numerous radiographs of common lung diseases were presented.

Foundation of Medical Practice Course

This 21-week course teaches core clinical subjects such as medicine and surgery.

PBL Tutors

Faculty members in the department of medical imaging participated as tutors by leading core multidisciplinary seminars in the Foundations of Medical Practice curriculum.

Drs. Jane Wall, Wayne Deitel and Danny Marcuzzi provided 102 hours of teaching time as tutors, plus an additional 55 hours of preparation for this course.

Year II Seminars

Radiology departments from each of the Medical Academies of the University of Toronto provided three interactive seminars to the Foundations of Medical Practice course. Topics for these two-hour seminars included

- Imaging in Obstetrics and Gynecology-supervised by Dr J. Wall
- Chest Radiology – supervised by Dr. TaeBong Chung
- Trauma Radiology -Supervised by Dr. Tim Dowdell
A total of 24 hours of seminar teaching was provided along with a similar amount of preparation time to deliver this seminar series.

**Clerkship**

The two-year clerkship consists of 78 weeks of clinical rotations. The department of medical imaging provides an array of teaching activity during the clerkship program.

**Year III Clerkship**

**Elective Students**

A significant number of third year medical students at the University of Toronto took electives in radiology at the various teaching hospitals during the 2001-2002 Academic year.

**Hospital Based Seminars**

Various Year III seminars have been held in the teaching hospitals as part of the Medicine - Surgery block rotations. These include a series of chest seminars, interventional, gastrointestinal, as well as neuroradiology seminars.

**Year IV**

**Medical Imaging Electives**

Electives in Medical Imaging are among the most popular medical under-graduate electives at the University of Toronto. In addition to teaching basic radiology skills these electives also serve to promote awareness about medical Imaging within the undergraduate medical community. Elective students are also given an opportunity to consider specialty training in radiology during these teaching blocks.

The popularity of the elective program continues to increase. This is evidenced by a very significantly increase in the number of fourth year electives taken in radiology in this past year as compared to the prior academic year.

**University of Toronto Electives**

Seventy-six University of Toronto students took radiology electives in their clerkship year at the various teaching hospitals during the 2001-2002 academic year.
Visiting Elective Students

Sixty-six non-University of Toronto students, many of these overseas foreign students in their senior undergraduate year, took part in visiting electives during the 2001–2002 academic year.

The Bruce Tovee LMCC Review Lectures

The Undergraduate Committee in Radiology has participated in this review course for many years. Three hours of radiology review lectures were given to final year medical students. The majority of these were University of Toronto students. The review course has also been very well received and attended by final year students from McMaster and other local medical schools. The lectures were given in the evening at the main medical lecture theatre of the University. Three, one hour lectures were given. These are listed below.

i) Musculoskeletal radiology – Dr. David Salonen
ii) Chest radiology – Dr. TaeBong Chung
iii) Gastrointestinal radiology – Dr. Nasir Jaffer

The final year students have had access to a series of notes, the MCCQE Study Guide. The medical imaging portion of this lecture series and syllabus were updated and revised by Drs Jaffer, Chung and Salonen.

Other Teaching Activities and Involvement

Physiotherapy Student Seminars

A series of seminars are given to the physical therapy students at the University of Toronto by radiologists at the various Academies each year.

Career Sampling Electives in Radiology

On a somewhat informal basis, undergraduate students, many in Year I, have spent various periods of time, from several days to weeks, in all of the teaching hospital radiology departments as part of a career sampling experience.

Undergraduate Teaching Computer File for Radiology

A comprehensive interactive computerized teaching program, called Radiofile has been developed by the Department of Medical Imaging. This program allows undergraduate students to have a uniform exposure to core medical imaging teaching material. The students can access this program either in the various radiology departments, or in the Academy computer laboratories. The program is available centrally, in the computer laboratory in the Medical Sciences Building.
The Internet and Undergraduate Education in Radiology

The Department of Medical Imaging hosts an internet web site on which various program descriptions are posted. Plans are being made to expand the role of the Internet in the delivery of and evaluation of undergraduate Medical Imaging teaching programs.

The Future Direction of the Medical Imaging Undergraduate Teaching Program

Efforts are currently under way to standardize the major components of the undergraduate medical imaging teaching program through the development and implementation of standardized curriculum and electronic teaching tools. This approach will be ongoing and promises to further optimize the efficiency, scope and value of the undergraduate teaching program in Medical Imaging.
CONTINUING EDUCATION PROGRAM

Organ Imaging Review
September 9-13, 2001

Course Description

This four day course focuses on aspects of primary interest to both radiologists and radiologists-in-training. The course content includes general concepts of diagnostic imaging with emphasis on recent advances. The participant learns new ideas and has the opportunity to enhance their knowledge in selected common clinical situations. The participant is also able to participate in problem-solving with daily case reviews in each of the organ systems.

Course Chairman: Walter Kucharczyk, M.D.
Course Director: Paul Hamilton, M.D.

University of Toronto Faculty

Atri, Mostafa, M.D., Associate Professor
Becker, Edna J., M.D., Associate Professor
Bret, Patrice, M.D., Professor
Christakis, Monique, M.D., Assistant Professor
Chung, Dae-Gyun, M.D., Lecturer
Clark, John, M.D., Assistant Professor
Cooper, Perry, M.D., Assistant Professor
Crossin, Jane, M.B., BCh, Clinical Fellow
Ehrlrich, Lisa, M.D., Associate Professor
Fox, Allan, M.D., Professor
Goldberg, Franklin, M.D., Assistant Professor
Haider, Masoom, M.D., Assistant Professor
Hamilton, Paul, M.D., Assistant Professor
Hanbidge, Anthony, M.B., B.Ch., Assistant Professor
Herman, Stephen J., M.D., Associate Professor
Jong, Roberta, M.D., Assistant Professor
Kachura, John, M.D., Assistant Professor
Keller, Anne, M.D., Assistant Professor
Khalili, Korosh, M.D., Lecturer
Kucharczyk, Walter, M.D., Professor and Chairman
Lax, Matthew, M.D., Lecturer
Merchant, Naeem, M.D., Assistant Professor
Montanera, Walter, M.D., Associate Professor
Muradali, Derek, M.D., Assistant Professor
Noël de Tilly, Lyne, M.D., Assistant Professor
O’Malley, Martin, M.D., Assistant Professor
Paul, Narinder, M.D., Clinical Fellow
Rajan, Dheeraj M.D., Lecturer
Rappaport, Daniel, M.D., Associate Professor
Rubenstein, Joel, M.D., Associate Professor
Salonen, David, M.D., Assistant Professor
Samuels, Taube, M.D., Assistant Professor
Shulman, Harry, M.D., Professor
Shumak, Rene, M.D., Assistant Professor
Stewart, Lori, M.D., Lecturer
TerBrugge, Karel, M.D., Professor
Weisbrod, Gordon, M.D., Professor
Weiser, William, M.D., Professor
White, Lawrence, M.D., Assistant Professor
Willinsky, Robert, M.D., Professor
Wilson, Christine, M.D., Assistant Professor
Wilson, Stephanie R., M.D., Professor
Wright, Barbara, M.D., Assistant Professor

Guest Faculty

Anderson, Mark W., M.D.
Associate Professor
Department of Radiology
University of Virginia Health Sciences System
Charlottesville, Virginia

Martinoli, Carlo, M.D.
Professor and Chair Department of Radiology
University Hospital of Genoa
Genoa, Italy
Paediatric Update: 2001
Saturday, September 8, 2001

Course Description

This course is intended for practicing Radiologists. It will provide an update on current indications and use of imaging modalities for commonly encountered conditions in children.

Course Chairman: Walter Kucharczyk, M.D.
Course Director: Paul Babyn, M.D.

University of Toronto Faculty

Armstrong, Derek, M.B., BS, Assistant Professor
Ash, Judith, M.D., Associate Professor
Blaser, Susan, M.D., Assistant Professor
Chait, Peter, M.D., Associate Professor
Chuang, Sylvester, M.D., Associate Professor
Connolly, Bairbre, M.D., Assistant Professor
Daneman, Alan, M.B., B.Ch., Professor
Gilday, David, M.D., Professor
Manson, David, M.D., Assistant Professor
Ranson, Marilyn, M.D., Assistant Professor
Traubici, Jeffrey, M.D., Lecturer
Yoo, Shi-Joon, M.D., Ph.D., Professor

Guest Faculty

Siegel, Marilyn, M.D.
Professor of Radiology and Pediatrics
Edward Mallinckrodt Institute of Radiology
Washington University School of Medicine
St. Louis, Missouri
Course Description

This 2 1/2 day program on women's imaging will provide participants with the most up-to-date practice standards in gynaecological and early fetal imaging. It will emphasize the integration of ultrasound into current clinical management and will explore some of the latest technological and clinical advances in women's imaging. It will be of interest to radiologists, obstetricians and gynaecologists and ultrasonographers.

Codirectors: Phyllis Glanc M.D., Shia Salem M.D. Department of Medical Imaging  
Jo-Ann Johnson M.D., Greg Ryan M.D. Department of Obstetrics and Gynaecology

University of Toronto Faculty

Atri, Mostafa, M.D., Associate Professor  
Causer, Petrina, M.D., Lecturer  
Common, Andrew, M.D., Assistant Professor  
Erlich, Lisa, M.D., Associate Professor  
Fong, Katherine, M.D., Assistant Professor  
Glanc, Phyllis, M.D., Assistant Professor  
Haider, Masoom, M.D., Assistant Professor  
Hanbidge, Anthony, M.D., Assistant Professor  
Muradeli, Derek, M.D., Assistant Professor  
Salem, Shia, M.D., Associate Professor  
Toi, Ants, M.D., Associate Professor  
Wilson, Stephanie, M.D., Professor

Guest Faculty

Lev-Toaff, Snna, M.D.  
Professor, Department of Radiology  
Thomas Jefferson University  
Philadelphia, Pennsylvania

Lyons, Edward, M.D.  
Professor, Department of Radiology  
University of Manitoba  
Winnipeg, Manitoba

Pandya, Pran, M.B.  
Consultant in Obstetrics and Fetal Medicine  
University College Hospital  
London, England
INVITED LECTURERS AND VISITING PROFESSORS

October 1-2, 2001
Dr. Jeffrey Newhouse
Department of Radiology
Columbia Presbyterian Medical Centre

“Radiologic Approach to Patients with Hematuria”

“Imaging in Prostate Cancer: What the Radiologist Needs to Know”

“Radiology of the Adrenal”

November 5-6, 2001
Dr. Mary Jane O’Neill
Department of Radiology
Massachusetts General Hospital

“Pelvic MR in Benign and Malignant Conditions of the Female Pelvis”

“The Role of MR in the Workup of Indeterminate Ultrasound of the Pelvis”

“The Role of Sono-Hysterography in the Evaluation of the Abnormal Endometrium”

January 7-8, 2002
Dr. Gilda Cardenosa
The Breast Center of Greensboro

“Unusual Breast Lesions and their Management”

“What should the Role of the Radiologist be in the Management of Women with Breast Diseases?”

“DCIS and their Management”

February 4-5, 2002
Dr. Pierre Lasjaunias
University of Paris
Centre Hospitalier de Bicêtre, Paris

“Spinal Cord Vascular Diseases”

“The Congenital Nature of Brain Arteriovenous Malformations”